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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/893,975 | 06/29/2001 | Sung-Hoe Yoon | 8733.467.00 | 6148 |
| 30827 | 7590 | 10/06/2003 | EXAMINER | |
| MCKENNA LONG & ALDRIDGE LLP 1900 K STREET, NW WASHINGTON, DC 20006 | | | MARKHAM, WESLEY D | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1762 | |

DATE MAILED: 10/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/893,975 | YOON, SUNG-HOE | |
| | Examiner | Art Unit | |
| | Wesley D Markham | 1762 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1 – 9 are currently pending in U.S. Application Serial No. 09/893,975, and an Office Action on the merits follows.

Priority

2. Receipt is acknowledged of papers (i.e., the certified copy of the priority document – Korean Application No. 2000-65714, filed on 11/7/2000) submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

3. The formal drawings (3 sheets, 3 figures) filed by the applicant on 6/29/2001 are approved by the examiner.

Specification

4. The disclosure is objected to because of the following informalities: On page 8, line 2, of the specification, the word “dimethylsiloxane” appears to be misspelled (i.e., as “dimenthylsiloxane”). The examiner notes that the word “dimethylsiloxane” is correctly spelled on page 9, line 20, of the specification. Appropriate correction is required.

Claim Objections

5. Claim 6 is objected to because of the following informalities: The word "dimethylsiloxane" appears to be misspelled (i.e., as "dimenthylsiloxane") on line 1 of Claim 6. The examiner notes that the word "dimethylsiloxane" is correctly spelled on page 9, line 20, of the specification. Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1 – 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Chung et al. (USPN 5,995,184).
8. Regarding independent Claim 1 (from which Claims 2 – 9 depend), Chung et al. teaches a method of fabricating an optical film (e.g., an optical thin film compensator) (Abstract), the method comprising the steps of preparing a substrate (Figure 4, step "402", Col.4, lines 5 – 8, and Col.6, lines 44 – 49), forming an alignment layer on the substrate (Figure 1, reference number "104", Figure 4, step "404", Col.4, lines 8 – 16, and Col.6, lines 50 – 54), rubbing the alignment layer (Col.6, lines 54 – 61), and forming a liquid crystal (LC) layer on the alignment layer, the LC layer including an additive (Figure 4, step "408", Col.2, lines 58 – 64, Col.3,

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lines 4 – 10, Col.5, lines 1 – 50, Col.6, lines 25 – 42, and Col.7, lines 7 – 16).

Regarding Claims 2 and 3, Chung et al. also teaches that forming the liquid crystal layer comprises coating a liquid crystal including the additive and curing /

crosslinking (i.e., “plasticizing”) the liquid crystal on the substrate (Claim 2),

particularly by using one of UV rays or heat (Claim 3) (Figure 4, steps “410” and

“412”, Col.3, lines 4 – 10, Col.4, lines 43 – 46, and Col.7, lines 18 – 44). Regarding

Claim 4, Chung et al. also teaches that the additive is a surfactant (Col.2, lines 63 –

67, Col.3, lines 1 – 3, and Col.5, lines 15 – 33). Regarding Claim 5, Chung et al.

does not explicitly teach that the additive (i.e., the surfactant) has both a

hydrophobic group and a hydrophilic group. However, Chung et al. does teach a

variety of different surfactants to use as the additive (Col.5, lines 15 – 31). In order to

be classified as a “surfactant”, a material must necessarily have both a hydrophobic

group and a hydrophilic group (see, for example, Col.5, lines 59 – 62 of Brandon et

al. (USPN 5,674,671), and/or Col.5, lines 10 – 15, of Rudnic et al. (USPN

5,987,876), both of which are simply cited to show that surfactants have both a

hydrophobic group and a hydrophilic group). Therefore, since Chung et al. teaches

surfactants in general, and surfactants necessarily have both a hydrophobic group

and a hydrophilic group, Chung et al. inherently teaches that the additive has both a

hydrophobic group and a hydrophilic group, as claimed by the applicant in Claim 5.

Regarding Claim 6, Chung et al. also teaches that the additive includes

dimethylsiloxane. Specifically, Chung et al. teaches that the additive can be a

surfactant such as polydimethylsiloxane (PDMS) (Col.5, lines 31 – 32). In this case,

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the examiner has reasonably interpreted PDMS to be an additive that "includes dimethylsiloxane", as claimed by the applicant. Regarding Claim 7, Chung et al. also teaches that the LC layer is a cholesteric LC layer. Specifically, Chung et al. teaches that their method is utilized to produce cholesteric compensators (Abstract and Col.2, lines 46 – 52). Regarding Claim 8, Chung et al. also teaches that the LC layer is a nematic LC layer. Specifically, Chung et al. teaches that the compensator produced by their method has a "nematic / air interface" (Col.2, lines 55 – 57), which is equivalent to stating that the LC layer (i.e., the layer that has an interface with the air) is a "nematic" LC layer.

9. Claims 1 – 6 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamada (USPN 5,667,854).
10. Regarding independent Claim 1 (from which Claims 2 – 9 depend), Yamada teaches a method of fabricating an optical film (e.g., a rectangular optical compensatory sheet) (Abstract), the method comprising the steps of preparing a substrate (Col.6, lines 2 – 5, Col.7, line 15, and Col.17, lines 43 – 61), forming an alignment layer on the substrate (Col.7, lines 15 – 16, and Col.18, lines 30 – 42), rubbing the alignment layer (Col.3, lines 62 – 64, Col.7, lines 17 – 19, and Col.18, lines 39 – 42), and forming a liquid crystal (LC) layer on the alignment layer, the LC layer including an additive (Col.4, lines 20 – 28, Col.7, lines 18 – 21 and 56 – 62, Col.8, lines 36 – 43, Cols.9 – 10, Col.16, lines 49 – 59, and Col.17, lines 30 – 35). Regarding Claims 2 and 3, Yamada also teaches that forming the liquid crystal layer comprises coating a

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liquid crystal including the additive and curing / crosslinking (i.e., "plasticizing") the liquid crystal on the substrate (Claim 2), particularly by using one of UV rays or heat (Claim 3) (Col.4, lines 29 – 31, Col.7, lines 22 – 33, Col.16, lines 37 – 48, and Col.17, lines 36 – 42). Regarding Claims 4 – 6, Yamada also teaches that the additive is a surfactant (Claim 4), particularly a surfactant having both a hydrophobic group and a hydrophilic group (Claim 5), more particularly an additive including dimethylsiloxane (Claim 6) (Col.8, lines 36 – 43, and Col.9, lines 35 – 42). Regarding Claim 8, Yamada also teaches that the LC layer is a nematic LC layer (Col.4, lines 13 and 32, Col.10, lines 58 – 59, and Col.16, lines 37 – 48).

11. Claims 1 – 5 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamanashi et al. (USPN 5,413,657).

12. Regarding independent Claim 1 (from which Claims 2 – 9 depend), Yamanashi et al. teaches a method of fabricating an optical film (e.g., a compensator for an LCD device) (Abstract), the method comprising the steps of preparing a substrate (reference number "11", Col.2, line 67, and Col.3, lines 13 – 62), forming an alignment layer on the substrate (Col.3, lines 23 – 31 and 57 – 59, and Col.26, lines 14 – 15), rubbing the alignment layer (Col.3, lines 23 – 31 and 57 – 59, and Col.26, lines 14 – 15), and forming a liquid crystal (LC) layer on the alignment layer, the LC layer including an additive (reference number "12", Col.2, lines 33 – 34, Col.3, lines 63 – 68, Col.4, lines 1 – 12, Col.24, lines 56 – 68, and Col.25, lines 1 – 57).

Regarding Claims 2 and 3, Yamanashi et al. also teaches that forming the liquid

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crystal layer comprises coating a liquid crystal including the additive and curing / hardening (i.e., "plasticizing") the liquid crystal on the substrate (Claim 2), particularly by using one of UV rays or heat (Claim 3) (Col.3, lines 1 – 5 and 65 – 68, and Col.26, lines 25 – 60). Regarding Claims 4 and 5, Yamanashi et al. also teaches that the additive is a surfactant (Claim 4), particularly a surfactant having both a hydrophobic group and a hydrophilic group (Claim 5) (Col.25, lines 21 – 46). Regarding Claim 8, Yamanashi et al. also teaches that the LC layer is a nematic LC layer (Col.3, lines 63 – 68, and Col.4, lines 1 – 16)

13. Claims 1, 4, 5, 8, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Epson Corp (JP 01-244430 A).

14. Regarding independent Claim 1, Epson Corp. teaches a method of fabricating an optical film (e.g., a liquid crystal element), the method comprising the steps of preparing a substrate (Figure 1, reference number "1"), forming an alignment layer on the substrate and rubbing the alignment layer (Abstract and Figure 1, reference number "3"), and forming a liquid crystal layer on the alignment layer, the liquid crystal layer including an additive (Abstract and Figure 1, reference number "5"). Please note that, per an oral translation from a USPTO translator, the reference numbers of Figure 1 are as follows: "1" – substrate, "2" – electrode, "3" – orientation film, "4" – spacer, and "5" – liquid crystal. Regarding Claims 4 and 5, Epson Corp. also teaches that the additive is a surfactant that has both a hydrophobic group and a hydrophilic group. Specifically, Epson Corp. teaches surfactants such as sodium

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alkylcarbonate and potassium alkylcarbonate (Abstract). Regarding Claims 8 and 9, Epson Corp. also teaches that the LC layer is a nematic LC layer (Claim 8) or smectic LC layer (Claim 9) (Abstract).

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. In the alternative to the reasoning presented above in paragraph 8, Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chung et al. (USPN 5,995,184) in view of Yamada (USPN 5,667,854).

17. Specifically, if the applicant intends to exclude PDMS from Claim 6 by reciting that "the additive includes dimethylsiloxane" (i.e., not polydimethylsiloxane), Chung et al. teaches all the limitations of Claims 5 and 6 as set forth above in paragraph 8, except for a method wherein the additive (i.e., having both a hydrophobic group and a hydrophilic group, as required by Claim 5) includes dimethylsiloxane. However, Chung et al. does teach that the additive should be either a reactive or non-reactive surfactant in general, and the specific surfactant utilized does not appear to be limited (Col.5, lines 15 – 32). An example of the classes of surfactants taught by Chung et al. is a silicon oil surfactant (Col.5, line 22). Yamada teaches a similar

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method of forming an optical compensatory sheet in which a surfactant is included in the LC layer / composition (Abstract and Col.4, lines 22 – 28). Further, Yamada teaches that dimethylsiloxane can be utilized as the surfactant (Col.9, lines 35 – 42) and that the inclined angle of the LC compound on a surface side (air side) can be controlled by selecting the compound(s), such as the surfactant, employed together with the LC compound (Col.16, lines 49 – 57). Therefore, it would have been obvious to one of ordinary skill in the art to utilize dimethylsiloxane (as taught by Yamada) as the surfactant in the process of Chung et al. with the reasonable expectation of successfully and advantageously choosing and utilizing a specific, well-known surfactant (i.e., dimethylsiloxane) out of the broader genus of surfactants taught generally by Chung et al. One of ordinary skill in the art would have done so with the expectation that the objectives of Chung et al. (i.e., producing an optical compensator for improving the viewing angle and contrast of LCDs) would have been met, regardless of the exact surfactant utilized. Since the combination of Chung et al. and Yamada reasonably suggests utilizing dimethylsiloxane as the surfactant in the process, the limitation in Claim 5 that the additive has both a hydrophobic group and a hydrophilic group is also met (i.e., because dimethylsiloxane has both a hydrophobic and a hydrophilic group).

18. Claims 7 – 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chung et al. (USPN 5,995,184) in view of Scheuble et al. (USPN 5,308,535).

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19. In the alternative to the reasoning / reference interpretation presented above in paragraph 8, Chung et al. teaches all the limitations of Claims 7 – 9 as set forth above in paragraph 8, except for a method wherein the LC layer is a cholesteric LC layer (Claim 7), a nematic LC layer (Claim 8), or a smectic LC layer (Claim 9). However, it is the purpose of Chung et al. to produce a liquid crystalline optical compensator for improving the viewing angle and contrast of LC displays (Abstract). Scheuble et al. teaches that, in the art of producing a liquid crystalline optical compensator (i.e., a device analogous to that produced by Chung et al.), the LC layer(s) of the compensator can be either nematic, smectic, or cholesteric, depending on the particular application (i.e., end use) of the compensator (Col.13, lines 25 – 56). Therefore, it would have been obvious to one of ordinary skill in the art to utilize any one of nematic, smectic, or cholesteric LC polymers in the LC layer of the optical compensator of Chung et al. with the reasonable expectation of successfully and advantageously producing a compensator for improving the viewing angle and contrast of LC displays (i.e., achieving the objective of Chung et al.), regardless of the specific type / orientation of the LC material that it utilized. As taught by Scheuble et al., the specific type of LC material (i.e., nematic, smectic, or cholesteric) utilized in the process of Chung et al. would be determined by one of ordinary skill in the art based on the desired end-use of the optical compensator.

20. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chung et al. (USPN 5,995,184) in view of Hanmer et al. (WO 98/00475 A1).

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21. In the alternative to the reasoning / reference interpretation presented above in paragraph 8, Chung et al. teaches all the limitations of Claims 8 and 9 as set forth above in paragraph 8, except for a method wherein the LC layer is a nematic LC layer (Claim 8) or a smectic LC layer (Claim 9). However, it is the purpose of Chung et al. to produce a liquid crystalline optical compensator for improving the viewing angle and contrast of LC displays (Abstract). Hanmer et al. teaches a similar method of producing a liquid crystal compensation film (Abstract). Hanmer et al. also teaches that, in a preferred embodiment, the polymerizable mesogenic material (i.e., the polymerizable LC material) exhibits nematic or smectic phases, most preferably the smectic phase because alignment is less easily disturbed prior to curing (page 11, lines 14 – 19). Therefore, it would have been obvious to one of ordinary skill in the art to utilize either nematic or smectic polymerizable mesogens (i.e., LC materials) in the LC layer of the optical compensator of Chung et al. with the reasonable expectation of successfully and advantageously producing a compensator for improving the viewing angle and contrast of LC displays (i.e., achieving the objective of Chung et al.), regardless of the specific type / orientation of the LC material that it utilized. Further and regarding Claim 9, an additional motivation to utilize a polymerizable smectic LC material in the process of Chung et al. is that such a material advantageously provides alignment that is less easily disturbed prior to curing.

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22. Claims 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Yamada (USPN 5,667,854) in view of Scheuble et al. (USPN 5,308,535).

23. Yamada teaches all the limitations of Claims 7 and 9 as set forth above in paragraph

10, except for a method wherein the LC layer is a cholesteric LC layer (Claim 7) or a

smectic LC layer (Claim 9). Specifically, Yamada teaches a nematic LC layer (Col.4,

lines 13 and 32, Col.10, lines 58 – 59, and Col.16, lines 37 – 48). However, the LC

material used in the process of Yamada does not appear to be particularly limited

(Col.7, lines 56 – 60). Scheuble et al. teaches that, in the art of producing a liquid

crystalline optical compensator (i.e., a device analogous to that produced by

Yamada), the LC layer(s) of the compensator can be either nematic, smectic, or

cholesteric, depending on the particular application (i.e., end use) of the

compensator (Col.13, lines 25 – 56). Therefore, it would have been obvious to one

of ordinary skill in the art to utilize either a smectic or a cholesteric LC material as

opposed to a nematic LC material in the LC layer of the optical compensator of

Yamada with the reasonable expectation of successfully and advantageously

producing a compensator that improves the viewing angle characteristics of LC

displays (i.e., achieving the objective of Yamada), regardless of the specific type /

orientation of the LC material that it utilized. As taught by Scheuble et al., the

specific type of LC material (i.e., nematic, smectic, or cholesteric) utilized in the

process of Yamada would be determined by one of ordinary skill in the art based on

the desired end-use of the optical compensator.

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24. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada (USPN 5,667,854) in view of Hanmer et al. (WO 98/00475 A1).

25. Yamada teaches all the limitations of Claim 9 as set forth above in paragraph 10, except for a method wherein the LC layer is a smectic LC layer. Specifically, Yamada teaches a nematic LC layer (Col.4, lines 13 and 32, Col.10, lines 58 – 59, and Col.16, lines 37 – 48). However, the LC material used in the process of Yamada does not appear to be particularly limited (Col.7, lines 56 – 60). Hanmer et al. teaches a similar method of producing a liquid crystal compensation film (Abstract). Hanmer et al. also teaches that, in a preferred embodiment, the polymerizable mesogenic material (i.e., the LC material) exhibits nematic or smectic phases, most preferably the smectic phase because alignment is less easily disturbed prior to curing (page 11, lines 14 – 19). Therefore, it would have been obvious to one of ordinary skill in the art to utilize a smectic LC material in the LC layer of the optical compensator of Yamada instead of a nematic LC material with the reasonable expectation of successfully and advantageously producing a compensator that improves the viewing angle characteristics of LC displays (i.e., achieving the objective of Yamada), as well as providing the additional advantage of producing an alignment that is less easily disturbed prior to curing.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hanrahan et al. (USPN 6,262,788 B1) teaches a method of

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making an optical retardation film, the method comprising rubbing a substrate, depositing a liquid crystal layer including an additive such as a surfactant on the rubbed substrate, and then curing the liquid crystal layer by applying heat or actinic (e.g., UV) radiation.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (703) 308-7557. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (703) 308-2333. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Wesley D Markham
Examiner
Art Unit 1762


WDM


SHRIVE P. BECK
SENIOR PATENT EXAMINER
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